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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,341	06/25/2003	Matthew O'Donnell	UOM 0274 PUSP	2637

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EXAMINER	
SHAY, DAVID M	

ART UNIT	PAPER NUMBER
3739	

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/603,341	O'DONNELL, MATTHEW	
	Examiner	Art Unit	
	david shay	3739	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *August 22, 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *July 8, 2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "at least one acoustic wave causes the microbubble to move"; the "at least one acoustic wave causes the microbubble to mix the material"; "measuring the elasticity of the material based on the movement of the microbubble"; the "nanobubble"; "the at least one acoustic wave causes the microbubble to manipulate at least one structure"; the microbubble manipulates "at least one cell for patterning"; "the microbubble has an optical refractive index that is different from an optical refractive index of the material and wherein the method further comprises propagating a beam of light through the microbubble"; "the microbubble has an optical refractive index that is different from an optical refractive index of the material and wherein the system further comprises means for propagating a beam of light through the microbubble"; the "at least one laser pulse also creates at least one acoustic shock wave via LIOB wherein the at least one acoustic shock wave operates as a high frequency, high precision acoustic source"; and the "means for measuring the elasticity of the material in contact with the microbubble based on the movement of the microbubble" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 33 and 38 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 33 positively recites a biological structure as part of the device. Claim 38 positively recites intact tissue as part of the device.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 5, 17, 20, 28, 42, and 43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The originally filed disclosure is silent on the manner in which "the ultrasound wave exerts a substantially continuous force at the surface of the microbubble"; the microbubble manipulates "at least one cell for patterning"; the "at least one laser pulse also creates at least one acoustic shock wave via LIOB wherein the at least one acoustic shock wave

operates as a high frequency, high precision acoustic source"; and the "means for measuring the elasticity of the material in contact with the microbubble based on the movement of the microbubble".

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 5, 7-10, 14, 22, 25, 26, 30-40 and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 is indefinite as it fails to further limit the claim from which it depends, as it is unclear what how what kind of material the bubble is created in manipulatively affects the method, and therefore what further limitation is intended to be implied is unclear. Claims 5 and 28 are indefinite as the exact meaning of the term "substantially continuous force" is unclear, as the very nature of acoustic or ultrasonic waves is to exert an undulating force. Claims 7 and 30 are indefinite as the exact meaning of the term "a force in the nano-Newton to micro-Newton level" is unclear. Claims 8 and 31 are indefinite as the exact meaning of the term "a force in the nano-Newton to micro-Newton level" is unclear. Claims 9 is indefinite as it fails to further limit the claim from which it depends, as the acoustic wave will inherently cause the microbubble to exert a mechanical force on at least one structure in contact with the microbubble and therefore what further limitation is intended to be implied is unclear. Claims 10, 16, and 17 are indefinite as they fail to further limit the claims from which they depend, as it is unclear what how what kind of material the bubble is in contact with manipulatively affects the method, and therefore what further limitation is intended to be implied is unclear. Claims 14 and 36 are indefinite as

the exact meaning of the term "nanobubble" and how this differs from a microbubble is unclear. Claim 22 is indefinite as it fails to further limit the claim from which it depends, as it is unclear what further structure is intended to be implied by reciting the mechanism of bubble creation and therefore what further limitation is intended to be implied is unclear. In claim 25, it is unclear what further structure is intended to be implied by reciting the laser pulse as an ultrafast laser pulse. In claim 26, it is unclear what further structure is intended to be implied by reciting the type of material that the device is directed at. In claims 30 and 31, it is unclear what further structure is intended to be implied by reciting the level of force at the surface of the microbubble. In claims 32, 34, 35, 37, and 39 it is unclear what further structure is intended to be implied by reciting the action of the acoustic field on the bubble or of the bubble on the medium in which it is situated. In claim 36 it is unclear what further structure is intended to be implied by reciting that the microbubble is a nanobubble. In claim 42 it is unclear what further structure is intended to be implied by reciting the effect of the laser on the medium.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-11, 13-16, and 18-42 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Kurtz et al.

See column 2, line 35 to column 6, line 56, wherein the laser pulse of Kurtz et al is about the length of the instant laser pulse, and thus the bubbles will be of about the same size, since

this is the controlling factor for bubble size, as taught by Kurtz et al; the acoustic force of 74 MPa will exert forces in the claimed ranges on an object that has a radius on the order of microns or nanometers; and the pulse repetition rate of the laser of Kurtz et al will cause a laser pulse to enter the material while the cavitation bubble from the previous pulse still exists, and thus will result in light being refracted by the bubble; and the ultrasound source is pulsed for 2.5 milliseconds, yielding a pulsed force, and a force which is substantially continuous for the 2.5 milliseconds

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 12, 17, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozkan et al in combination with Kurtz et al. Ozkan et al teaches a method of cell patterning. Kurtz et al teach manipulating tissue using microbubbles. It would have been obvious to the artisan or ordinary skill to employ the micrbubble method of Kurtz et al in the patterning of Ozkan et al since the method of Kurtz et al does not require that charges be induces on the items to be patterned, or to employ patterning in the method of Kurtz et al, since the method of Kurtz can be used for any purposes, as taught by Kurtz et al, and in either case to measure the elasticity of the material, since this provides no unexpected result, and is well within the scope of one having ordinary skill in the art, thus producing a device and method such as claimed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to david shay whose telephone number is (571) 272-4773. The examiner can normally be reached on Tuesday through Thursday from 6:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Linda Dvorak, can be reached on Monday, Tuesday, Thursday, and Friday. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DAVID M. SHAY
PRIMARY EXAMINER
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